Creating A Greener Energy Future For the Commonwealth

DOER
Massachusetts Department of Energy Resources

ENERGY MANAGEMENT SERVICES

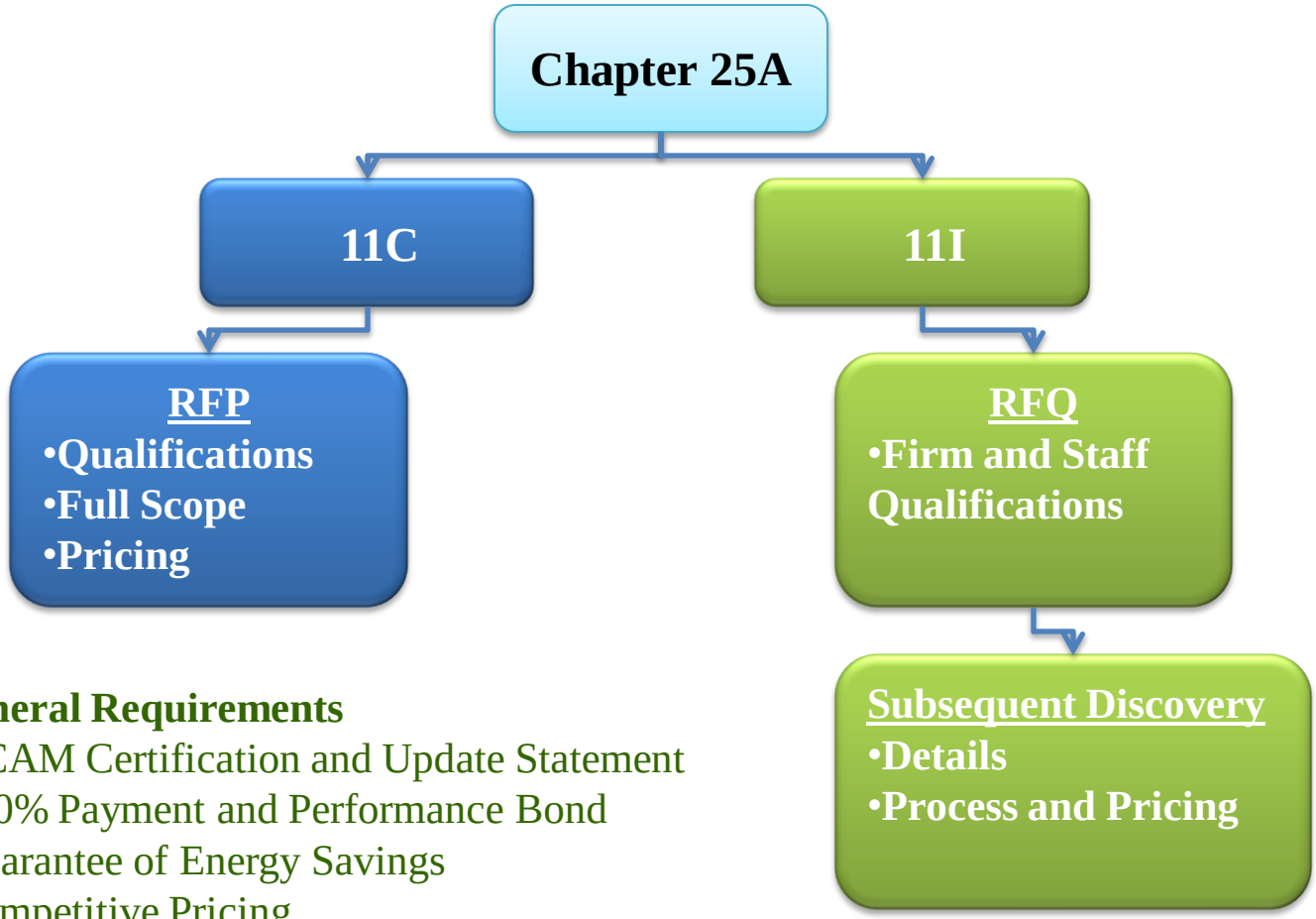
Eileen McHugh
Municipal Energy Programs Coordinator

June 7, 2011

Energy Management Services (EMS)

EMS is a type of performance contract used to install energy efficient facility improvements, with ***no*** up front cost, paid for out of ***guaranteed energy savings*** from your ***existing*** operating budget.

Procurement Process

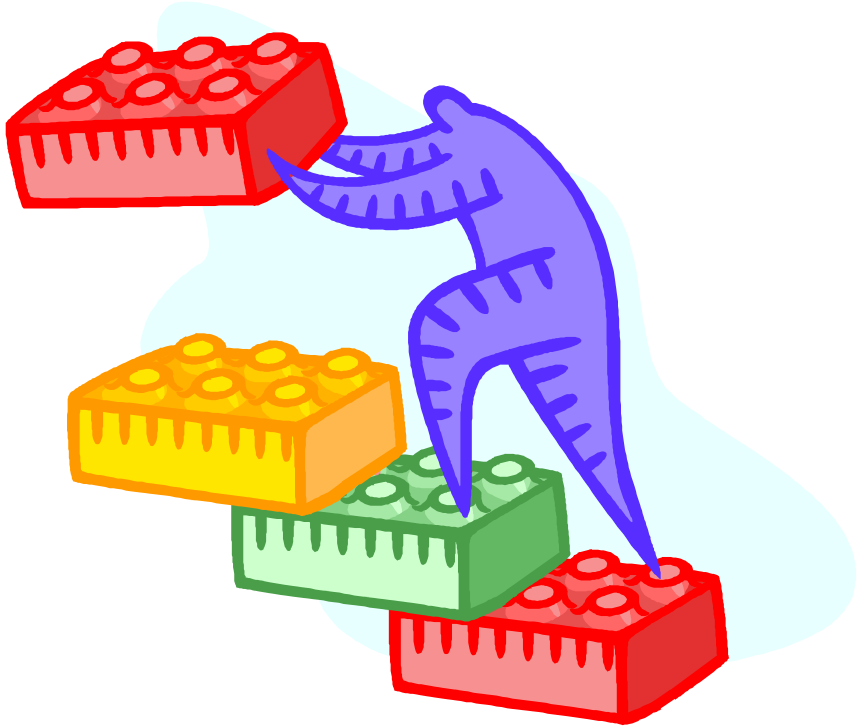


General Requirements

- DCAM Certification and Update Statement
- 100% Payment and Performance Bond
- Guarantee of Energy Savings
- Competitive Pricing
- Maximum 20 Year Term
- DOER Filing Requirements

Traditional Contract

Pay for activity

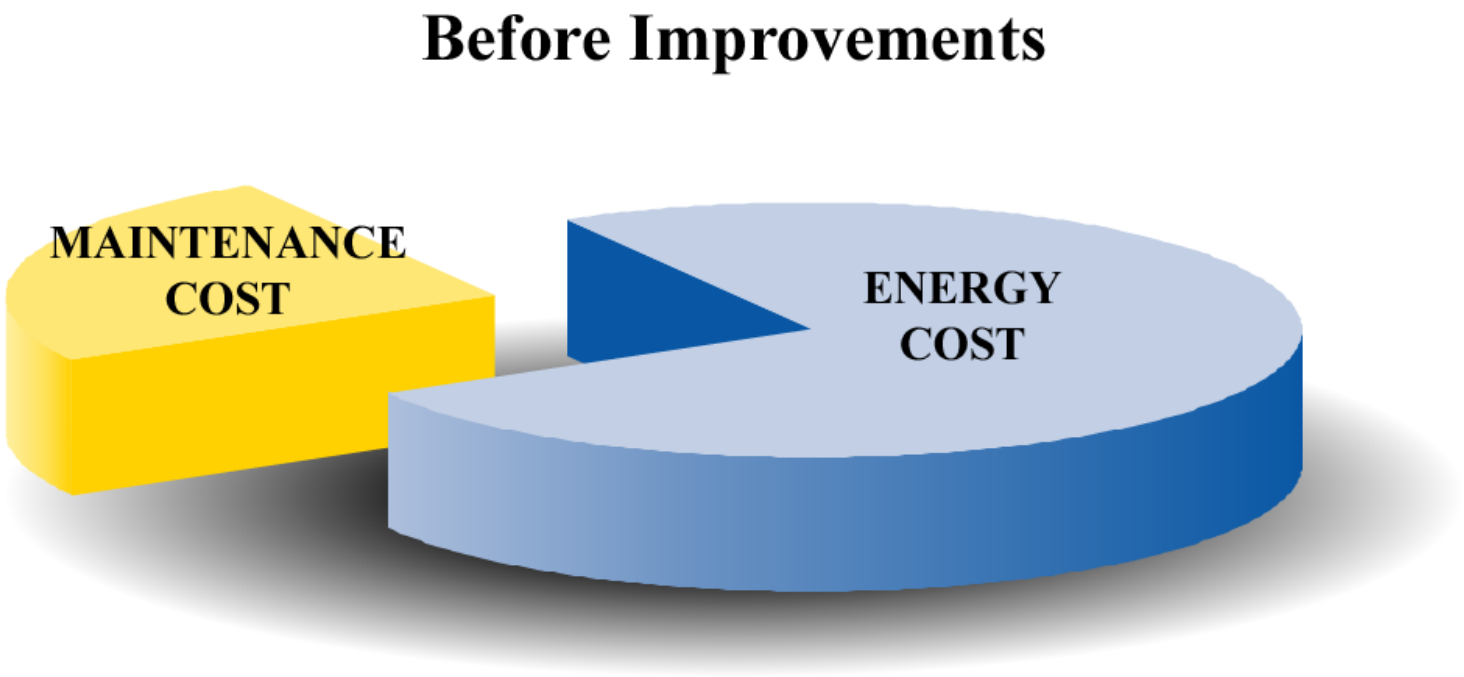


Performance Contract

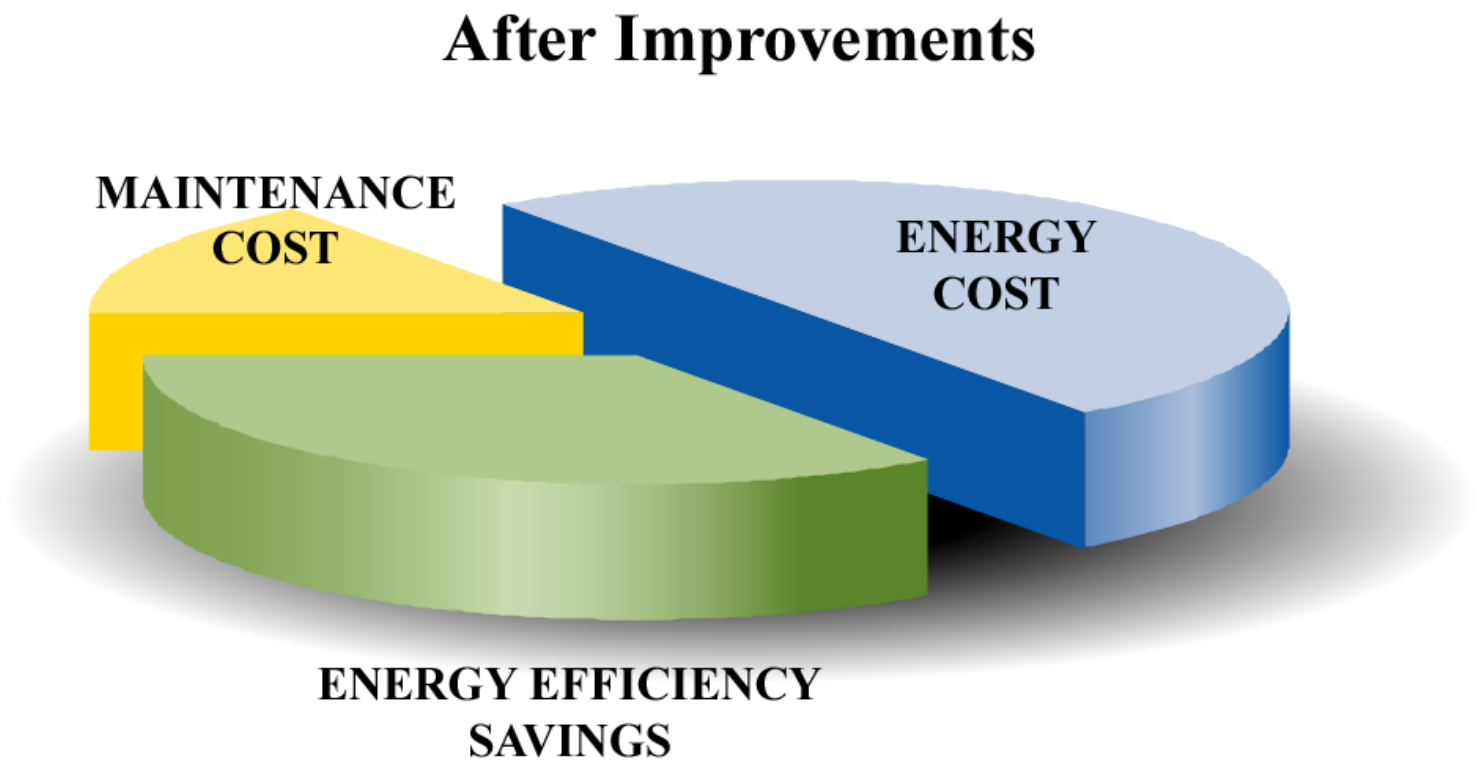
Pay for results

Requires the ESCO to provide a performance-based guarantee

Operating Budget=$1m



Operating Budget=$1m

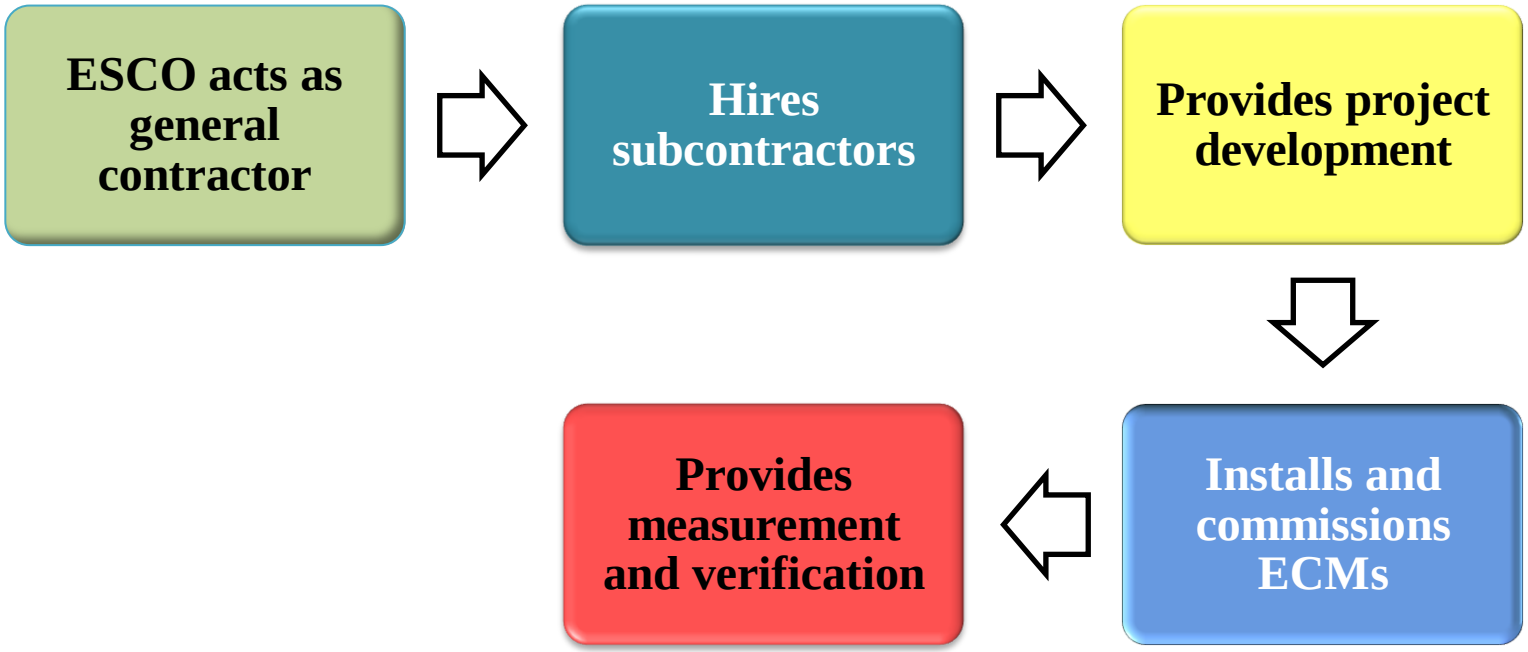


Energy Services Company (ESCO)

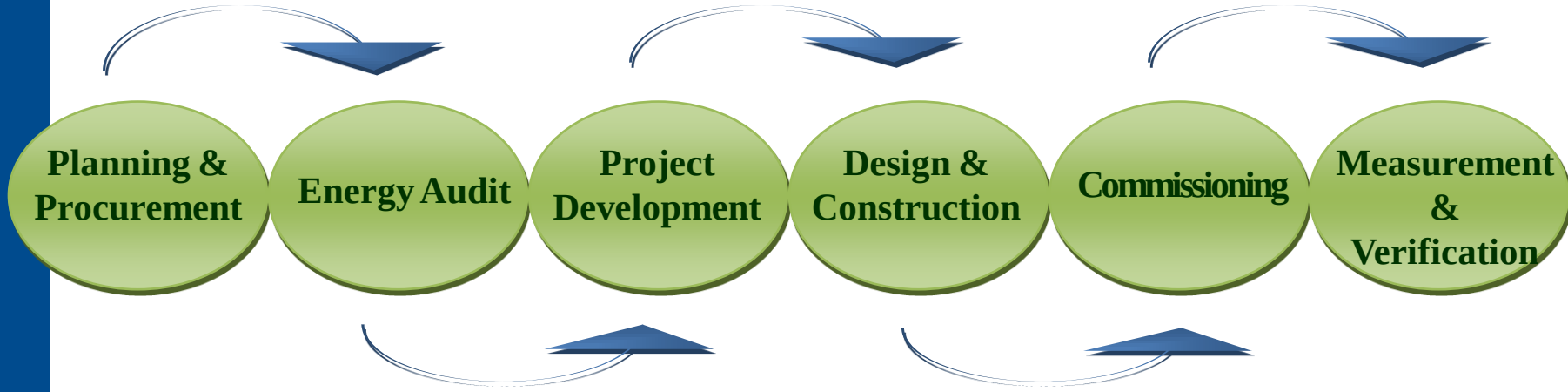
ESCOs offer a broad range of services including,

- Engineering, feasibility studies, and investment grade energy audits
- Equipment acquisition and installation
- Load management
- Training
- Maintenance services
- Measurement and verification
- Guaranteed results

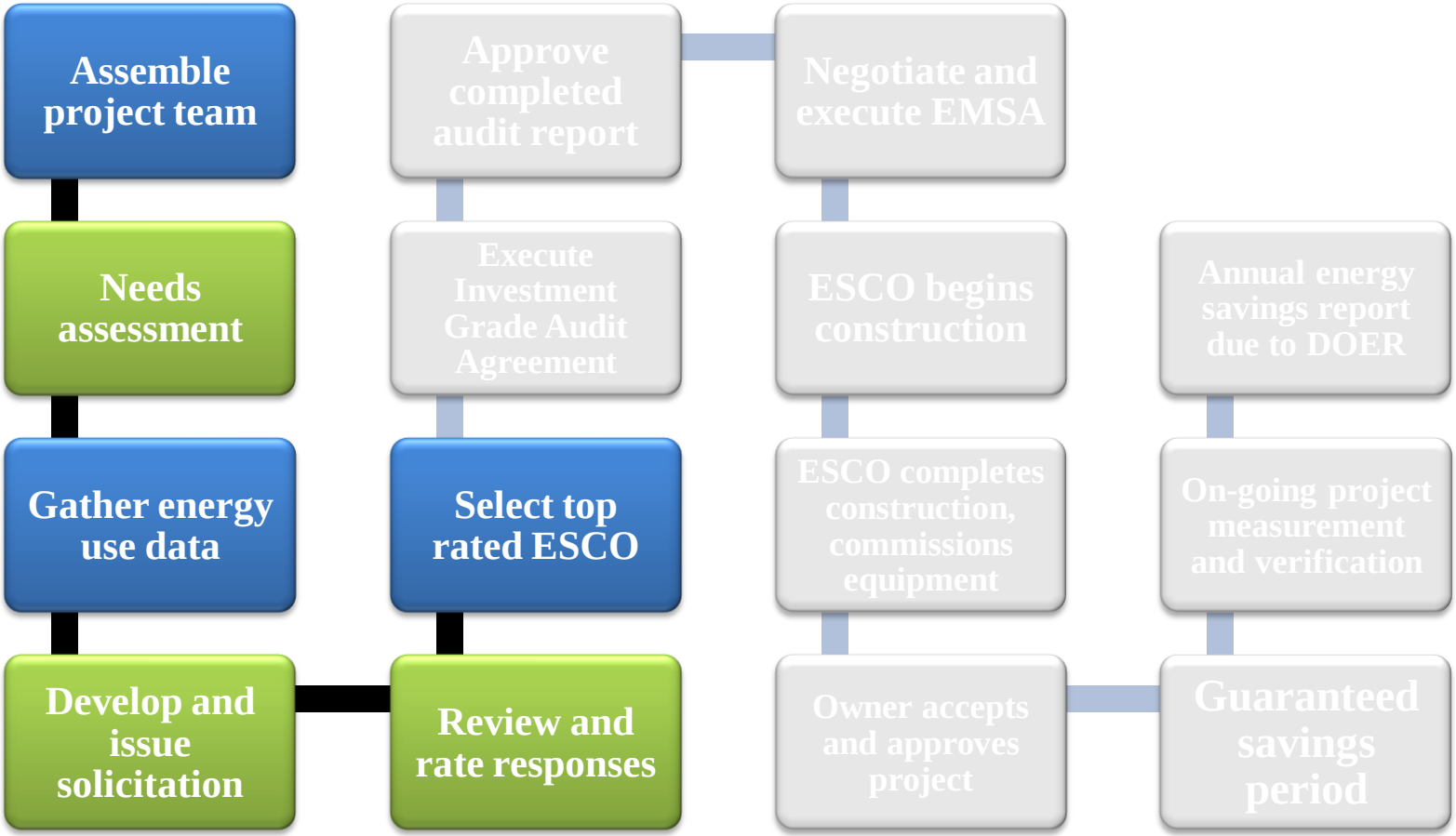
ESCO Services



Procurement Process



Planning and Procurement



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Develop & Issue RFP/RFQ

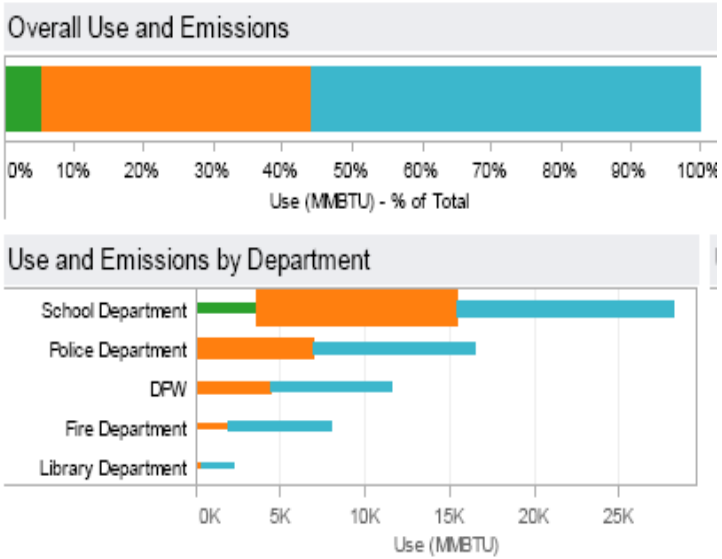
- Mandatory Requirements
- File according to instructions on web page
- Contact Eileen McHugh

MassEnergyInsight

POWERING EFFICIENCY

- **FREE** online tool for MA cities, towns, RSD & WTP
- **>200** entities trained to date
- **136** WWTP/DWTPs in MassEnergyInsight,

  mix of districts and in towns
- Provides:
  - Automated electronic download of utility data
  - All energy costs and accounts in one place
  - Standardized and custom reporting



www.massenergyinsight.net

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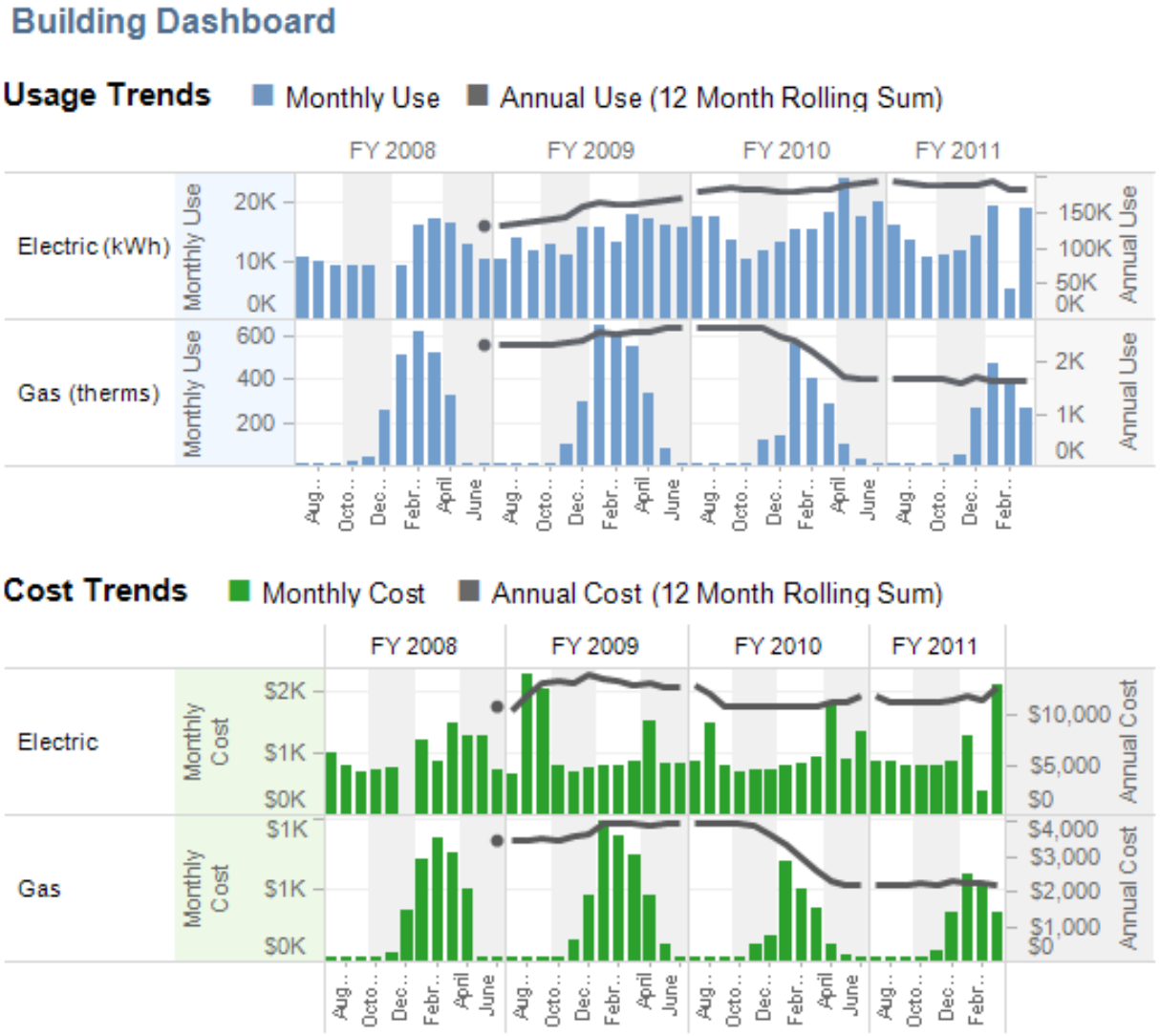
Sample Report – Pump Station



For more info on MassEnergyInsight contact:

Aimee.Powelka@state.ma.us

Next Training:

Thursday, June 23
2:00 PM to 3:15 PM

Registration Deadline

June 16

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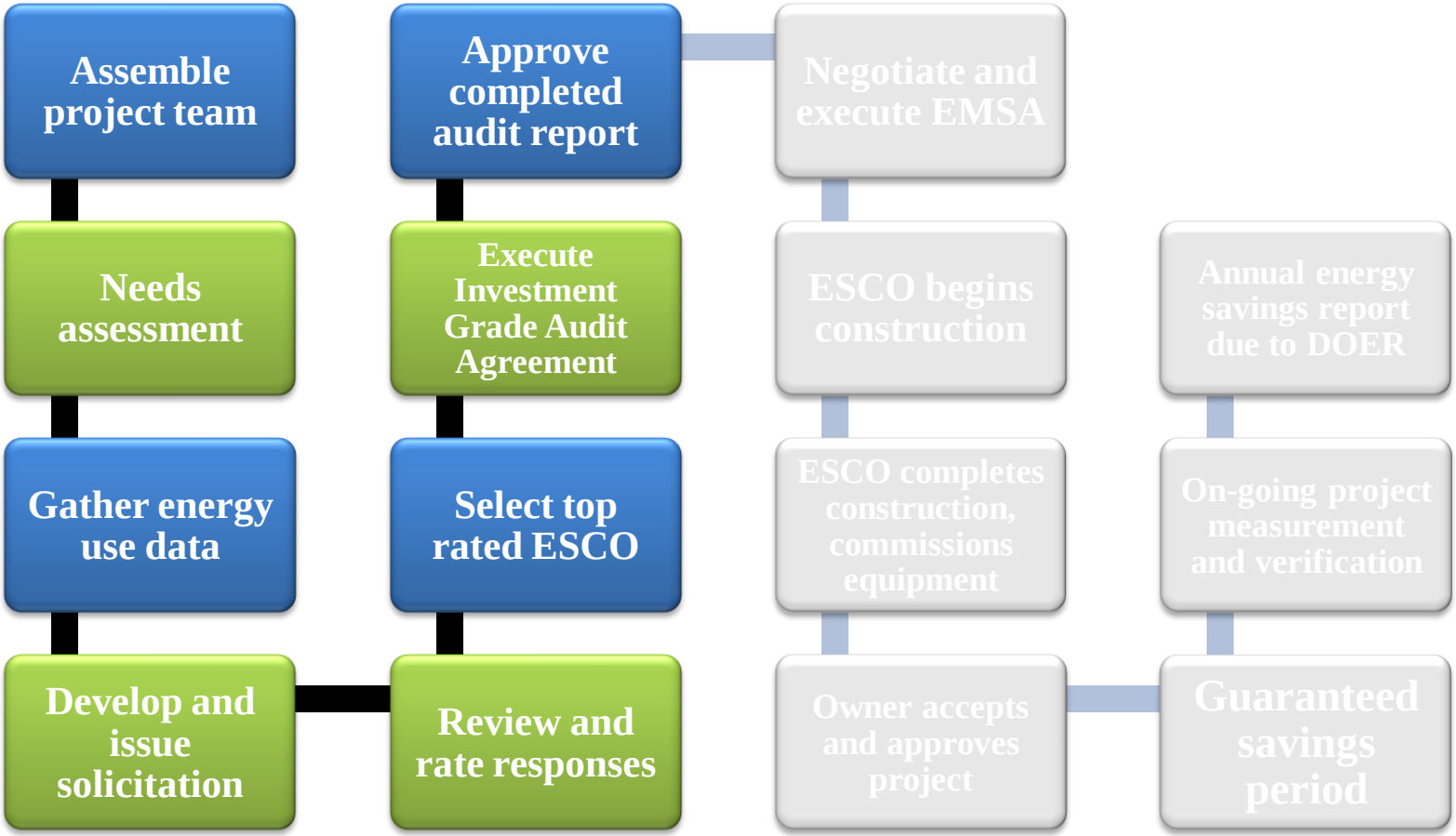
Procurement Process



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Investment Grade Energy Audit

- Defines the scope of the project
- Defines the FEMP M&V option
- Provides:
  - List of measures
  - Total project savings
  - Estimates total project costs
  - The documented baseline values used to guarantee savings.

Procurement Process

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Negotiate Contract

- Energy Management Services Agreement
  - Construction
  - Commissioning
  - Training
  - Operations and Maintenance
  - Measurement and Verification

- Financing
  - How do you pay for it?

Procurement Process

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Design & Construction

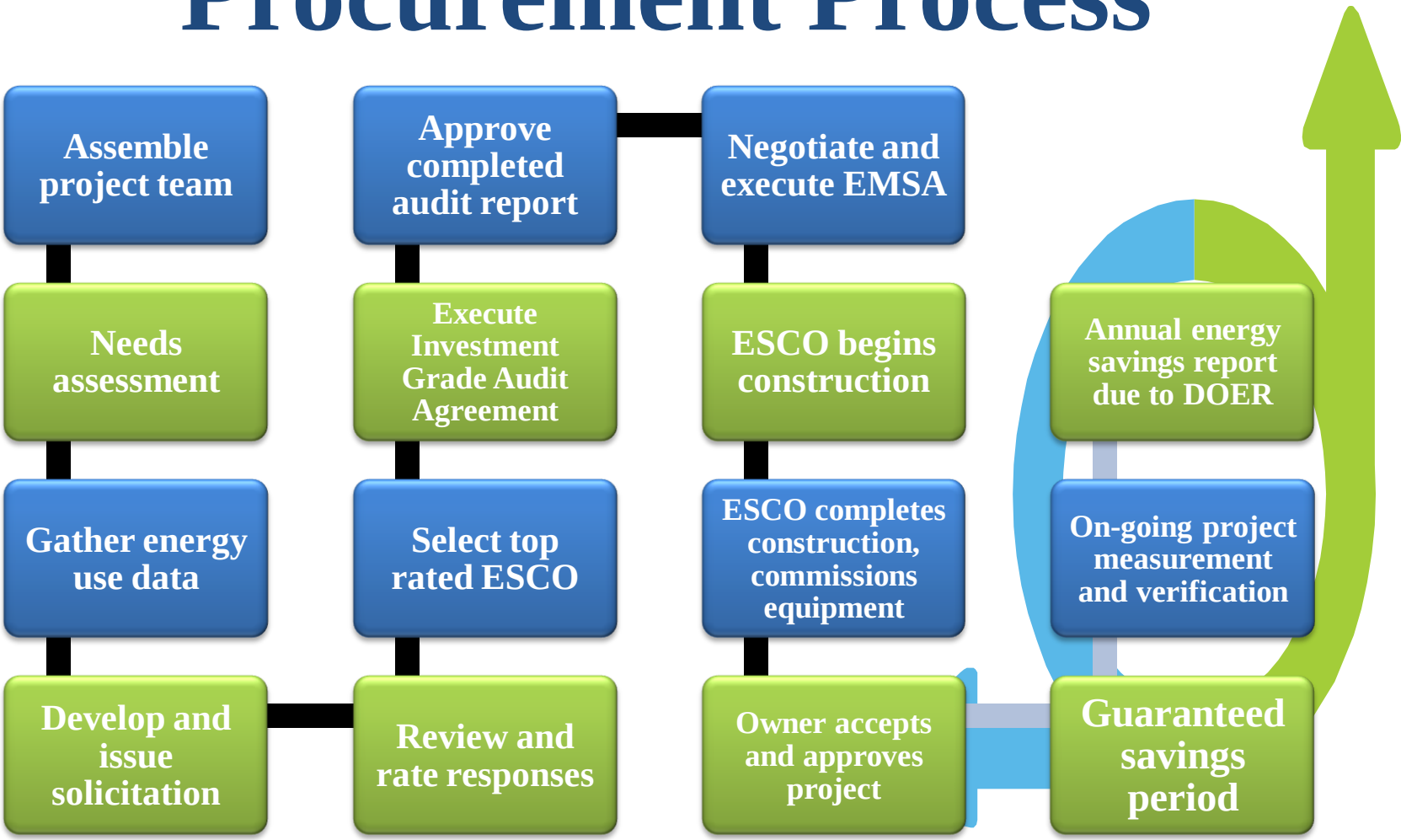
- Implementation schedule
- Define obligation and responsibilities
- Progress Meetings

Project Acceptance

- Owner acknowledges receipt of the Energy Conservation Measure(s) as fully installed, inspected, and in good working condition.

- Owner does not accept ECMs

Procurement Process



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Measurement and Verification

An M&V is central to proper savings determination and the basis for verification. The M&V fundamentally defines the meaning of the word ‘savings’ for each project.

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Project Funding Through Energy Savings

John Lanzoni
Siemens

June 7, 2011

Electricity Use in the Municipal Water and Wastewater Treatment Sector is Significant

National numbers:

- Sector consumes 35% of a municipality's energy budget (EFAB, 2001)
- Electricity is the 2nd largest operating cost at WWTPs, ~25 to 40% of the total operating budget (PGE, 2003)
- Electricity accounts for ~80% of all water processing and distribution costs at WTPs (EPRI, 2002)
- In US, >$6.5 billion spent annually (ASE, 2002)

Challenges Faced by WWTP Owners/Operators

- Unfunded mandates – phosphorus removal, TKN limits….
- Increased demand for services - need more treatment capacity
- Decreasing demand for services – oversized plants
- Inefficient, failing equipment – maintenance budget swells
- Inability to meet permit levels
- Increasing costs for energy, chemicals and services

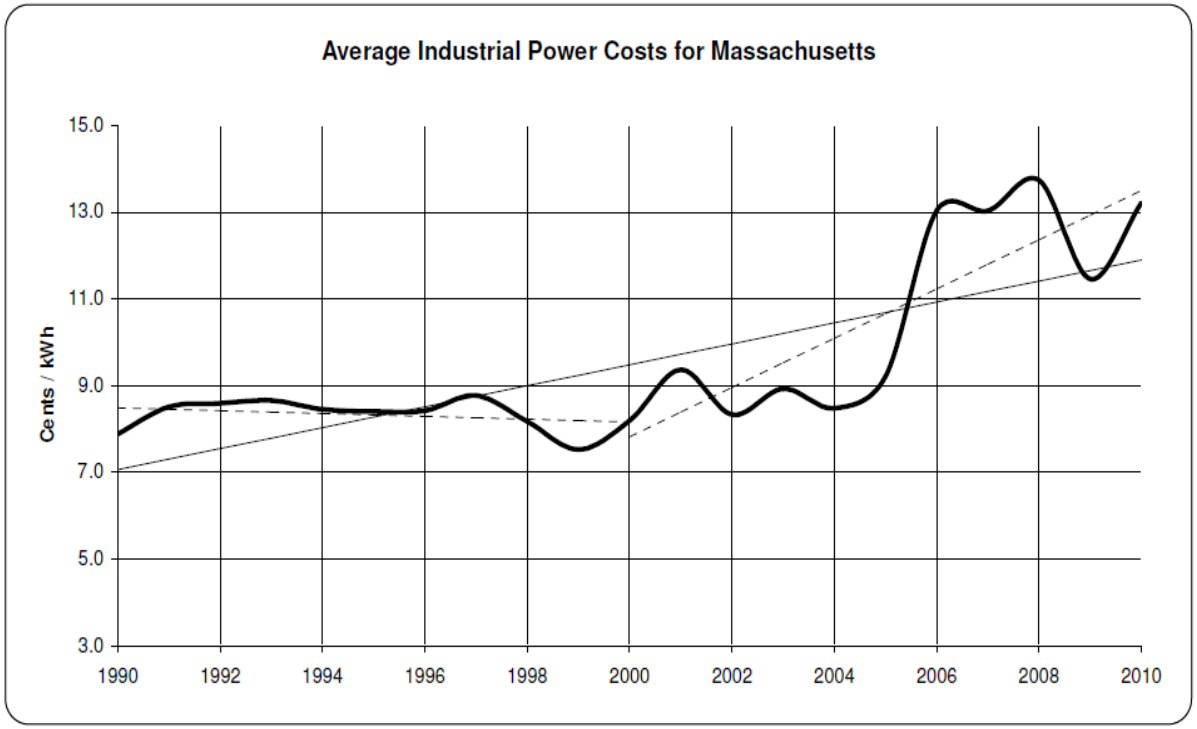
MA Actual, Historical and Projected Electricity Costs

Average Industrial Power Cost by State

State: **Massachusetts**

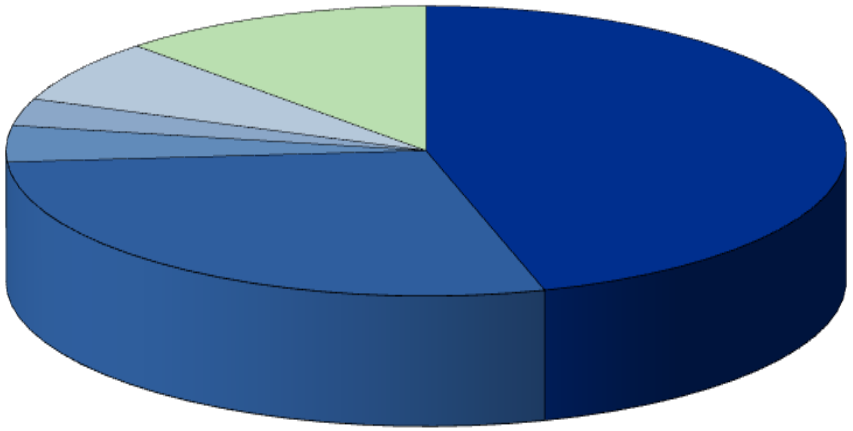
0.1322 $/kWh; 2010 Costs in Massachusetts
24.13% Regression between 1990 - 2010
56.75% Regression between 2000 - 2010
2.49% Inflation rate 1990 - 2010 (Annual Compound Rate)
4.44% Inflation rate 2000 - 2010 (Annual Compound Rate)

21.61 Cents/kWh; Projected in 2030
31.50 Cents/kWh; Projected in 2030



Year	Cents/kWh
1990	7.89
1991	8.52
1992	8.60
1993	8.66
1994	8.46
1995	8.41
1996	8.43
1997	8.78
1998	8.18
1999	7.53
2000	8.20
2001	9.37
2002	8.34
2003	8.93
2004	8.48
2005	9.22
2006	13.04
2007	13.03
2008	13.74
2009	11.46
2010	13.22

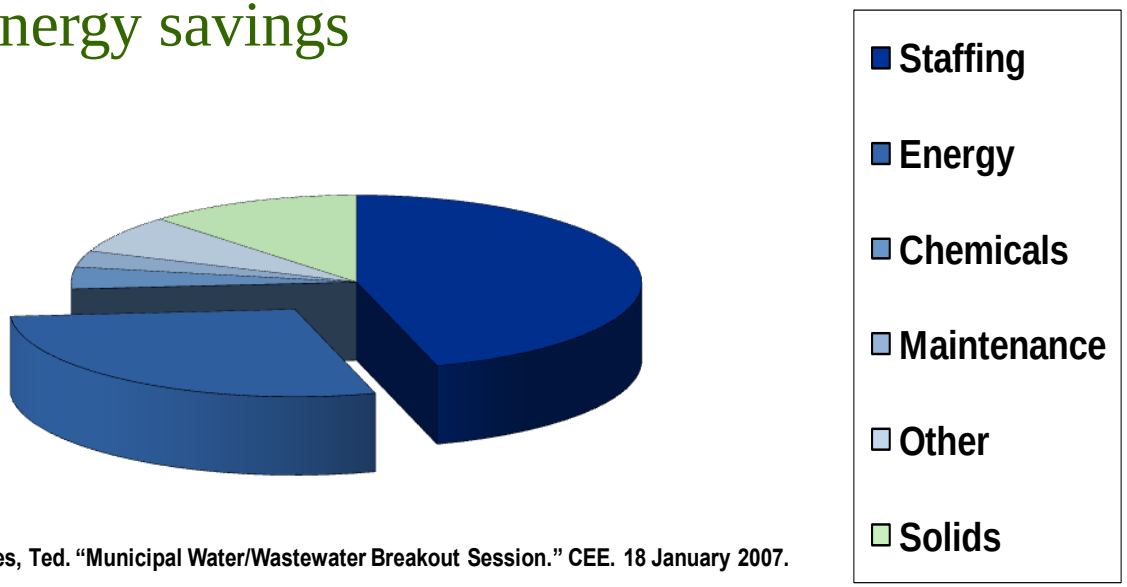
Staffing and Energy are the Two Largest Operating Costs for Most WWTPs



Source: Jones, Ted. "Municipal Water/Wastewater Breakout Session." CEE. 18 January 2007.

Energy Savings are Readily Achievable

- Nearly one-third of a typical WW utility's annual expenses are energy costs
- Energy Efficiency Upgrade opportunities exist at all WWTPs and consistently provide savings of 10-15% or more and can exceed 50%
- Process Optimization can provide additional energy and non-energy savings



Source: Jones, Ted. "Municipal Water/Wastewater Breakout Session." CEE. 18 January 2007.

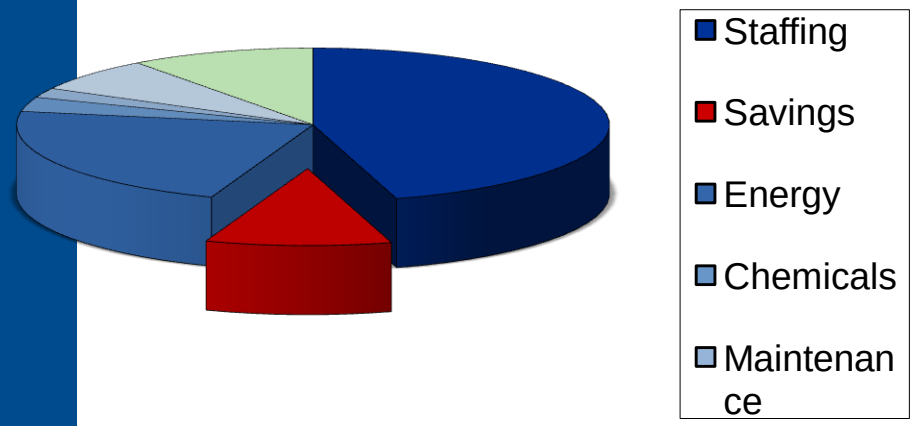
Lack of Funding is the Most Common Obstacle to Project Implementation

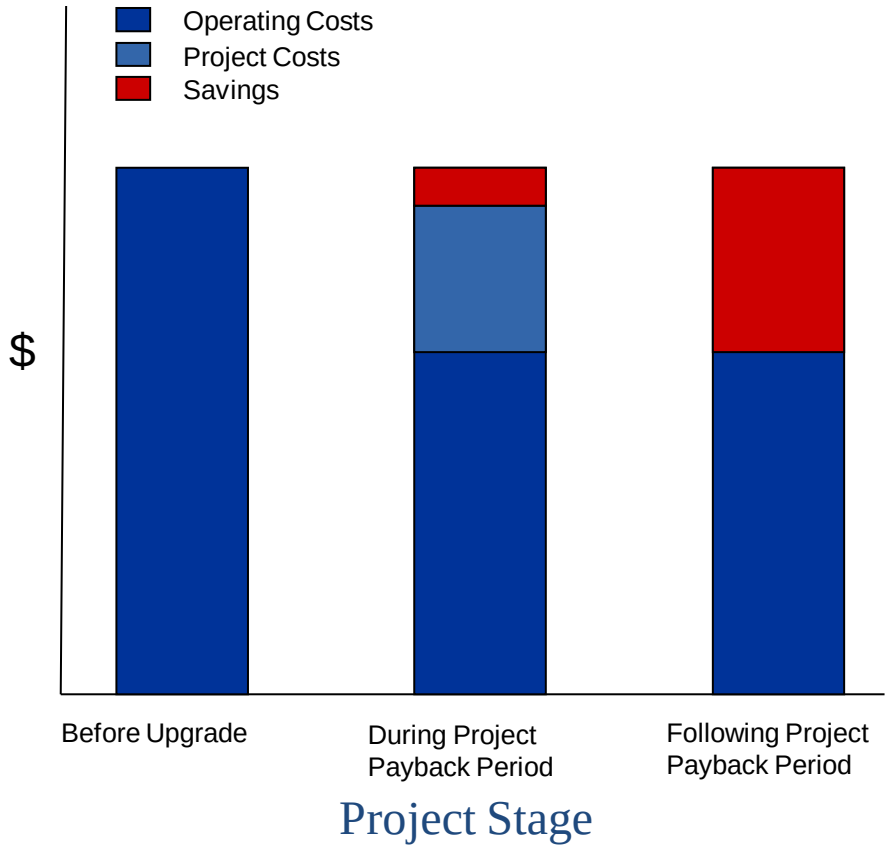
- Insufficient capital reserve
- Nearing allowable debt limits
- Political pressures associated with bond issuance or rate increase
- Other regulatory driven upgrades consume limited resources

Performance contracting allows the customer to leverage limited capital budgets by using funds already allocated to the operating budget to fund energy projects.

Energy Efficiency and Process Optimization Can Self-Fund

- Some or all of realized savings can be used to payoff project costs
- Projects can be implemented with little or no capital dollars from the municipality



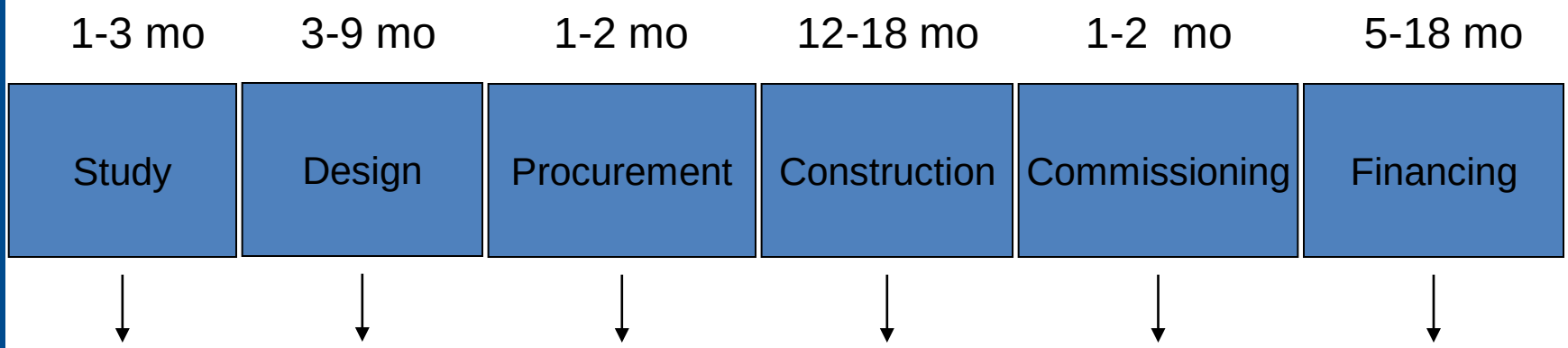


Comparing the Two Approaches

Scope	Performance Contracting	Bid/Spec
Review Feasibility Study	Yes	Yes
Design and Produce Construction Plan and Specs	Yes	Yes
Secure All Permits	Yes	Yes* Major Permits will be applied for
Perform Construction Services	Yes	Yes
Start Up Systems	Yes	No
Operate and Maintain the whole system	Yes - if desired by customer	No
Financial Options	Capital/Bond/Lease	Capital/Bond/Lease
Relationship	Continuous Partnership over life of contract	Scope Only? Completion? Commissioning? Warranty?
Upfront Fees	No	Yes
Performance & Financial Guarantee	Operational and Financial	No
Change Orders	Rarely	Yes - Almost Always

True Cost of a Project

Under a Bid/Spec project each component is secured separately



Done by Consultant

Done by Consulting Engineer (different from engineer who completed the study)

Bids are prepared and each piece of equipment and service is purchased separately

Completed by construction firm, possibly with multiple subs and a third party owners representative

Services procured under a separate contract and offered by a third party

Number of Participants depends On type of financing

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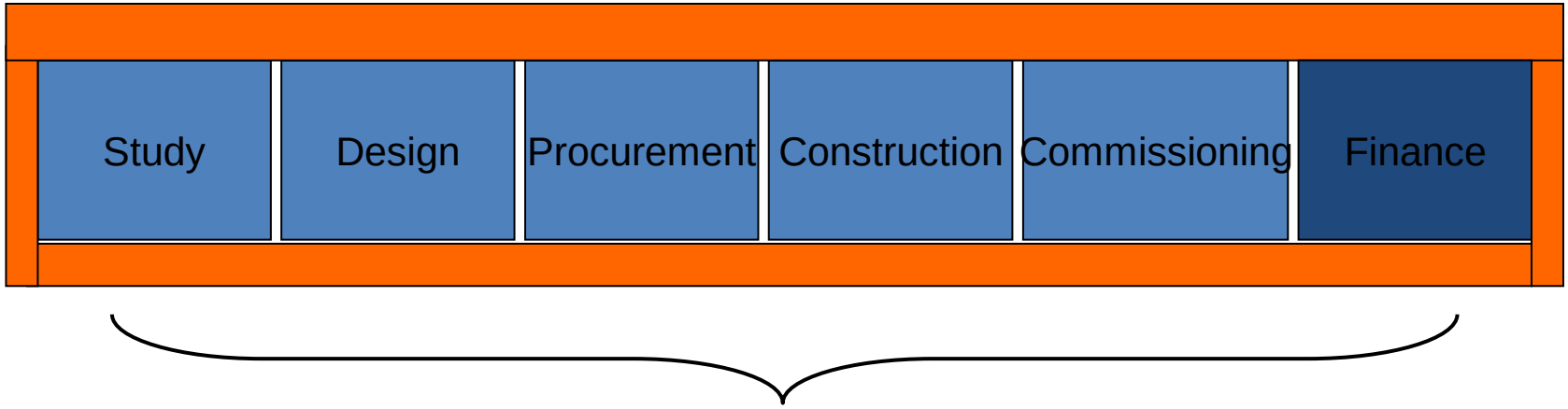
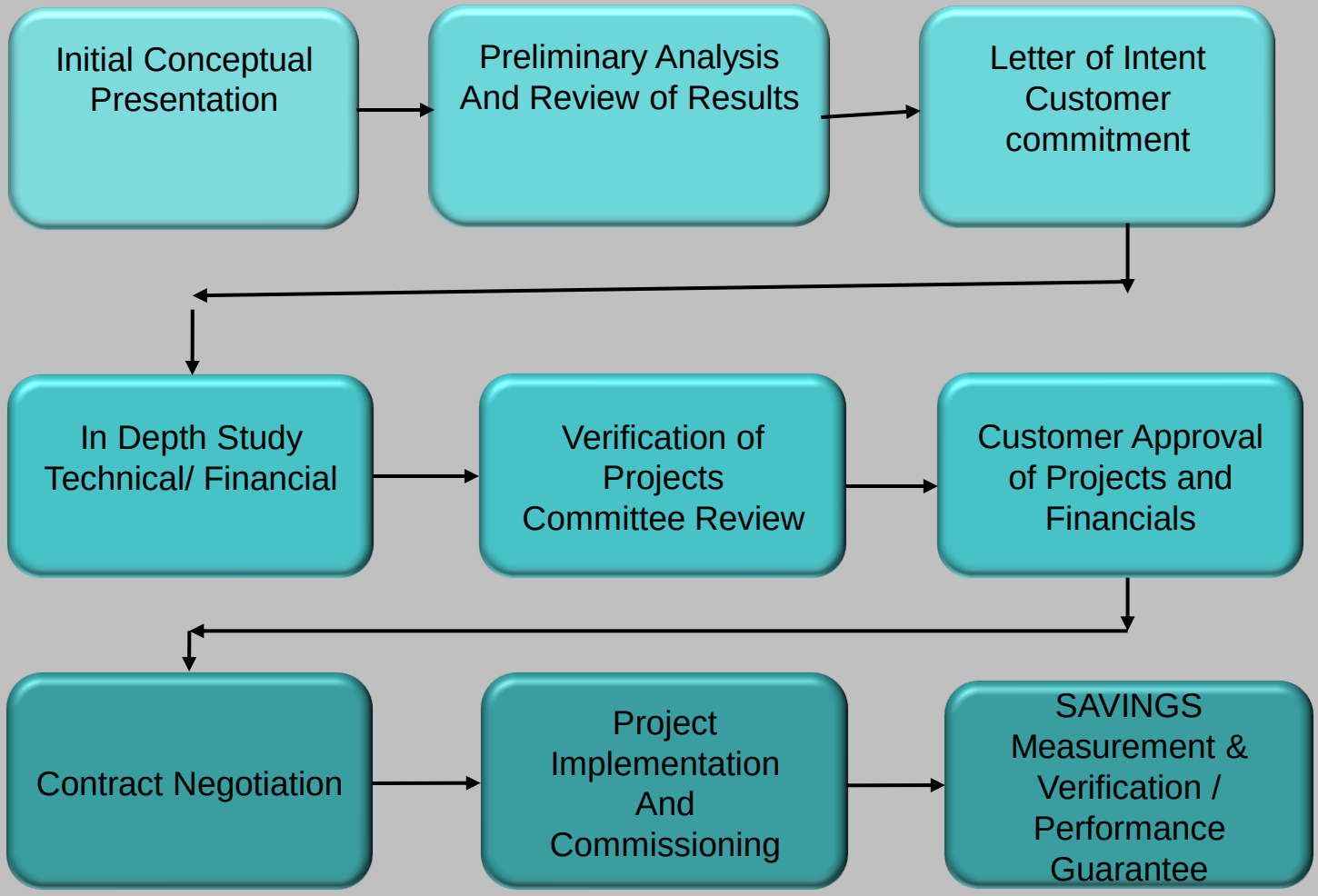
True Cost of a Project

Under Performance Contracting, the project cost includes each of these components.



One Point of contact and one Purchasing Contract for all components

Typical PC Process



Guaranteed Savings Agreements through an ESCO Provide Numerous Benefits

Advantages:

- Allows Municipality to leverage capital budgets by using operating budget to fund energy improvements.
- Well-suited for large or diverse energy projects
- Offer a single point of responsibility for any or all phases of the project:
  - Identification of savings opportunities
  - Design, Construction, Startup and Training
  - Finance

Guaranteed Savings Agreements through an ESCO Provide Numerous Benefits

Advantages:

- Provide a savings guarantee and a financial commitment to makeup any shortfalls in guaranteed savings
- May provide measurement and verification services to confirm performance
- May provide long-term service or operation to maintain performance

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Solar Energy – Municipal Benefits

Dan Smith
Siemens

June 7, 2011

Opportunity Knocks!

- Promotes Environmental Stewardship
- Generates Revenue for Town Budget
    - Land Lease
    - Permit Fee
    - Real Estate Taxes
    - Purchase Power at Reduced Rate
    - Creates Construction Jobs
- Highly Reliable
- Scalable
- Renewable Resource
- Proven Technology
- No fuel Costs
- No Emissions
- Promotes Energy Independence
- Provides PEAK POWER

Water Pollution Control - 2010 Cost Snapshot

In 2010 WPC facilities consumed 2.69MW at an average cost of $.14kWh. Totaling $385K+

January	244,268	$37,215	0.152
February	254,479	$36,618	0.144
March	232,035	$31,909	0.138
April	210,219	$29,117	0.139
May	213,406	$31,135	0.146
June	209,935	$32,049	0.153
July	209,082	$31,601	0.151
August	216,643	$31,397	0.145
September	229,841	$30,099	0.131
October	196,161	$24,235	0.124
November	212,251	$27,019	0.127
December	270,511	$43,080	0.159
Sum	**2,698,831**	**$385,473.97**	
Monthly Avg	**224,903**	**$32,122.83**	**0.143**

Water Pollution Control - 2011 Cost Savings Snapshot

Assuming in 2011 WPC facilities consumed the same 2.69MW with a Purchase Power Agreement @ $.10kWh. WPC would save $115K in Energy Costs in the 1st year

January	244,268	$24,427	$0.1000
February	254,479	$25,448	$0.1000
March	232,035	$23,204	$0.1000
April	210,219	$21,022	$0.1000
May	213,406	$21,341	$0.1000
June	209,935	$20,994	$0.1000
July	209,082	$20,908	$0.1000
August	216,643	$21,664	$0.1000
September	229,841	$22,984	$0.1000
October	196,161	$19,616	$0.1000
November	212,251	$21,225	$0.1000
December	270,511	$27,051	$0.1000
Sum	**2,698,831**	**$269,883.10**	
Monthly Avg	**224,903**	**$22,490.26**	**$0.100**

Summary

- **City/Town/Enterprise Fund benefits financially with the installation of a solar farm.**
- **Reduced utility bills**–Cash flow positive from day 1 to year 20
- **Protection from escalating energy rates**–Experts predict that the cost of electricity will continue to increase faster than inflation. Locking in a low rate today will protect you tomorrow, and if prices rise as projected, your savings will increase
- **No production or performance risks**–The risk of a system performing less than projected falls on the Developer

Summary

- **Carbon footprint reduction**–On average, 100kW of DC solar power installed in North America will reduce approximately 175,000 lbs of CO2 annually
- **No operation or maintenance expenses**–Customers only purchase the energy produced, so all operation and maintenance is on the Developer.
- **Marketing opportunities**–Switching from brown power to clean renewable energy is one the best marketing and PR tools available to businesses and municipalities.
- **Freeing up of capital for critical investments**–Saving money on operating costs allows you to preserve capital to invest in our core business
- **What does this cost the taxpayer?** Virtually nothing! The developer finances the project and the town would enter into a Purchase Power Agreement

Contact Information

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(617) 626-7305

mass.gov/energy-management-services_public-procurement

“Energy Management Services”